



# ECH8690

## Power MOSFET

60V, 4.7A, 55mΩ -60V, -3.5A, 94mΩ Complementary Dual ECH8

ON Semiconductor®

<http://onsemi.com>

### Features

- On-State Resistance Nch:RDS(on)1=42mΩ(typ.)  
Pch:RDS(on)1=73mΩ(typ.)
- 4V drive
- Nch+Pch MOSFET
- Protection diode in
- Halogen free compliance

### Specifications

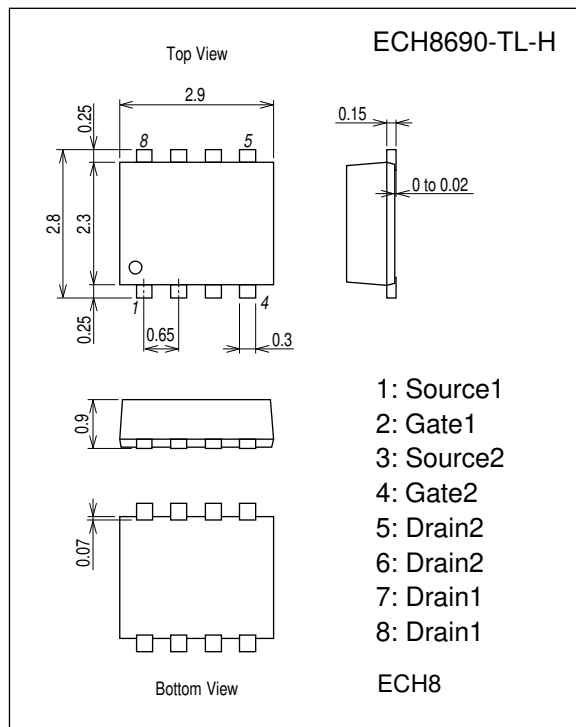
**Absolute Maximum Ratings** at Ta = 25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain to Source Voltage	V <sub>DSS</sub>		60	-60	V
Gate to Source Voltage	V <sub>GSS</sub>		±20	±20	V
Drain Current (DC)	I <sub>D</sub>		4.7	-3.5	A
Drain Current (Pulse)	I <sub>DP</sub>	PW≤10μs, duty cycle≤1%	30	-30	A
Allowable Power Dissipation	P <sub>D</sub>	When mounted on ceramic substrate (1200mm <sup>2</sup> ×0.8mm)1unit		1.5	W
Total Dissipation	P <sub>T</sub>	When mounted on ceramic substrate (1200mm <sup>2</sup> ×0.8mm)		1.8	W
Channel Temperature	T <sub>ch</sub>			150	°C
Storage Temperature	T <sub>stg</sub>			-55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

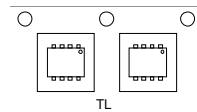
unit : mm (typ)  
7011A-001



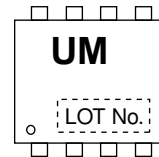
### Ordering & Package Information

Device	Package	Shipping	note
ECH8690-TL-H	ECH8	3000 pcs. / reel	Pb-Free and Halogen Free

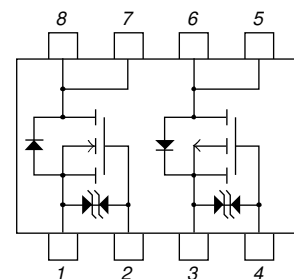
### Packing Type: TL



### Marking



### Electrical Connection



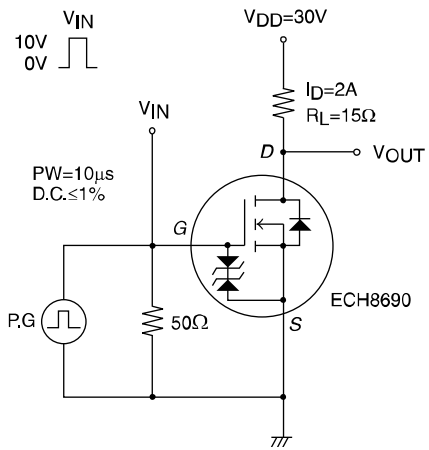
# ECH8690

## Electrical Characteristics at Ta = 25°C

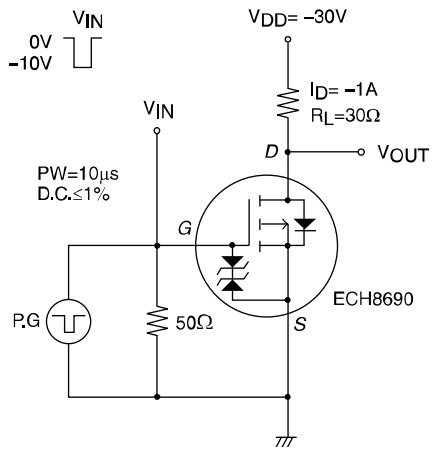
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain to Source Breakdown Voltage	V(BR)DSS	ID=1mA, VGS=0V	60			V
Zero-Gate Voltage Drain Current	IDSS	VDS=60V, VGS=0V			1	μA
Gate to Source Leakage Current	IGSS	VGS=±16V, VDS=0V			±10	μA
Cutoff Voltage	VGS(off)	VDS=10V, ID=1mA	1.2		2.6	V
Forward Transfer Admittance	yfs	VDS=10V, ID=2A		4.2		S
Static Drain to Source On-State Resistance	RDS(on)1	ID=2A, VGS=10V		42	55	mΩ
	RDS(on)2	ID=1A, VGS=4.5V		53	74	mΩ
	RDS(on)3	ID=1A, VGS=4V		61	85	mΩ
Input Capacitance	Ciss	VDS=20V, f=1MHz		955		pF
Output Capacitance	Coss			58		pF
Reverse Transfer Capacitance	Crss			45		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit.		7		ns
Rise Time	t <sub>r</sub>			8.4		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>			76		ns
Fall Time	t <sub>f</sub>			23		ns
Total Gate Charge	Qg		VDS=30V, VGS=10V, ID=4.7A		18	
Gate to Source Charge	Qgs			3		nC
Gate to Drain "Miller" Charge	Qgd			2.8		nC
Diode Forward Voltage	VSD	IS=4.7A, VGS=0V		0.82	1.2	V
[P-channel]						
Drain to Source Breakdown Voltage	V(BR)DSS	ID=-1mA, VGS=0V	-60			V
Zero-Gate Voltage Drain Current	IDSS	VDS=-60V, VGS=0V			-1	μA
Gate to Source Leakage Current	IGSS	VGS=±16V, VDS=0V			±10	μA
Cutoff Voltage	VGS(off)	VDS=-10V, ID=-1mA	-1.2		-2.6	V
Forward Transfer Admittance	yfs	VDS=-10V, ID=-1.5A		3.4		S
Static Drain to Source On-State Resistance	RDS(on)1	ID=-1A, VGS=-10V		73	94	mΩ
	RDS(on)2	ID=-0.5A, VGS=-4.5V		97	135	mΩ
	RDS(on)3	ID=-0.5A, VGS=-4V		108	153	mΩ
Input Capacitance	Ciss	VDS=-20V, f=1MHz		790		pF
Output Capacitance	Coss			63		pF
Reverse Transfer Capacitance	Crss			45		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit.		10		ns
Rise Time	t <sub>r</sub>			8.8		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>			84		ns
Fall Time	t <sub>f</sub>			29		ns
Total Gate Charge	Qg		VDS=-30V, VGS=-10V, ID=-3.5A		15	
Gate to Source Charge	Qgs			2.6		nC
Gate to Drain "Miller" Charge	Qgd			2.2		nC
Diode Forward Voltage	VSD	IS=-3.5A, VGS=0V		-0.83	-1.2	V

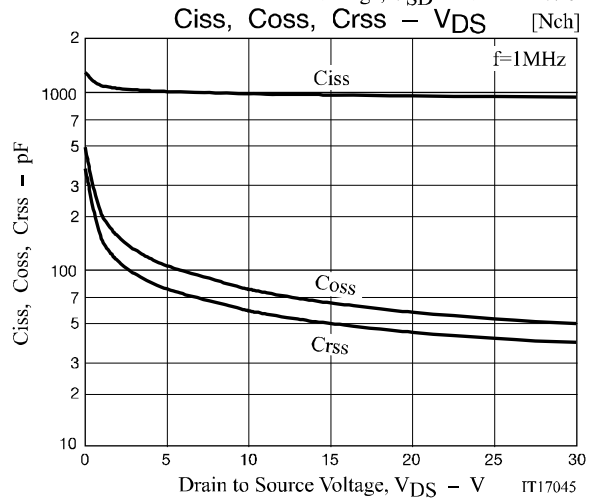
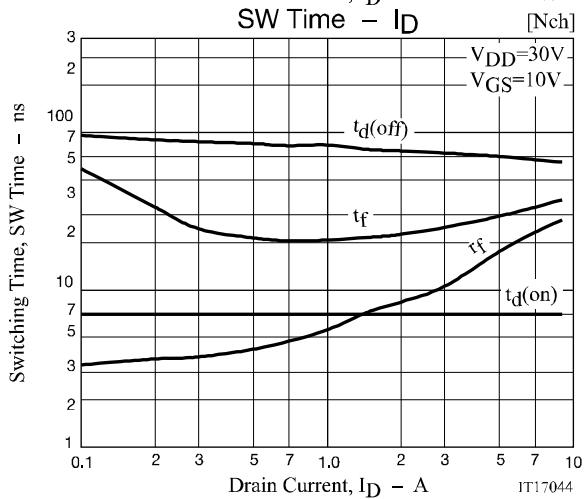
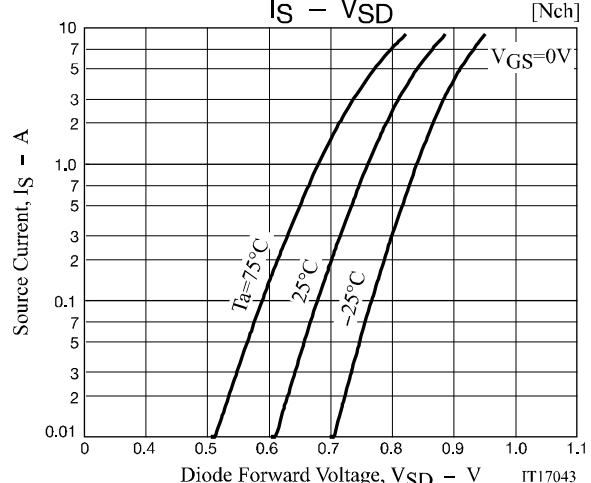
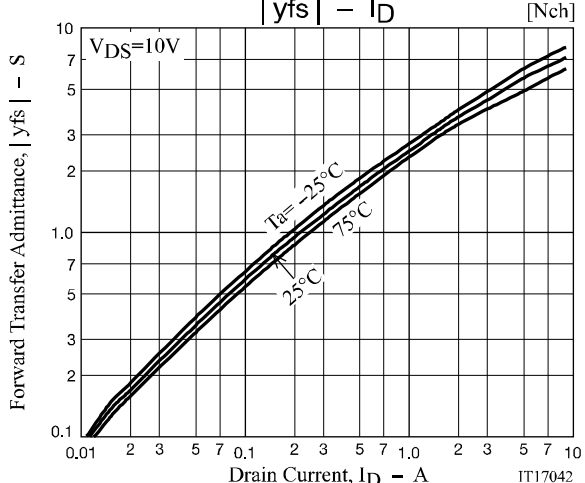
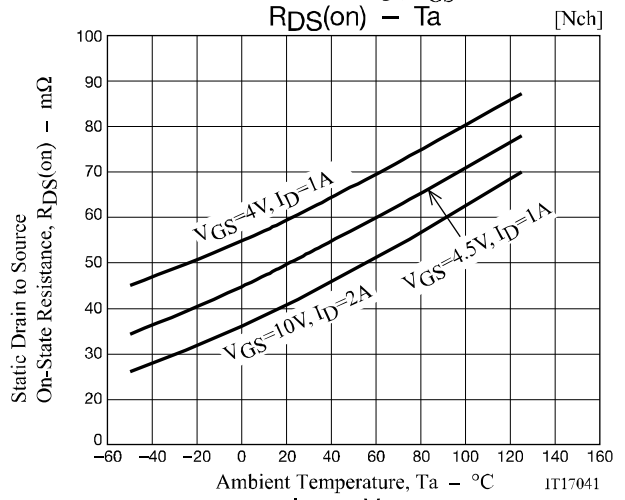
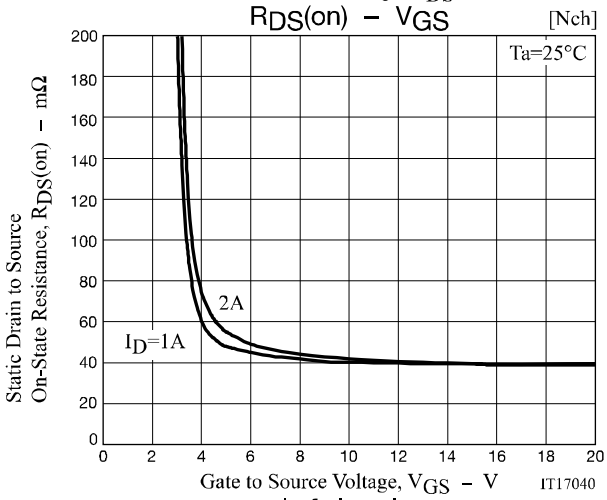
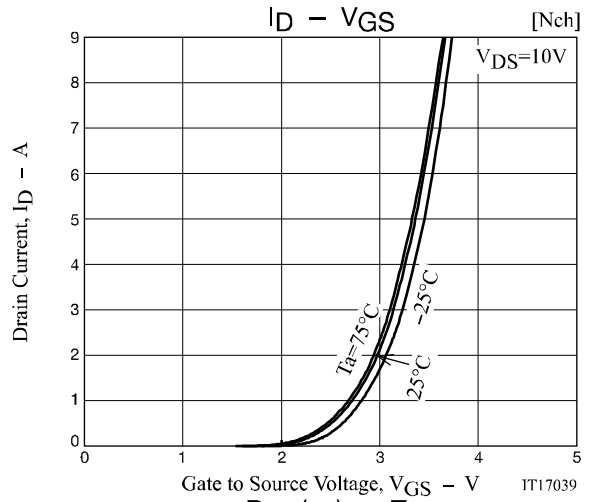
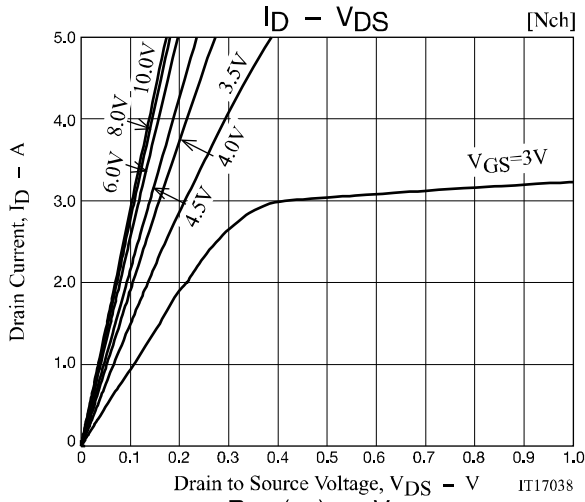
## Switching Time Test Circuit

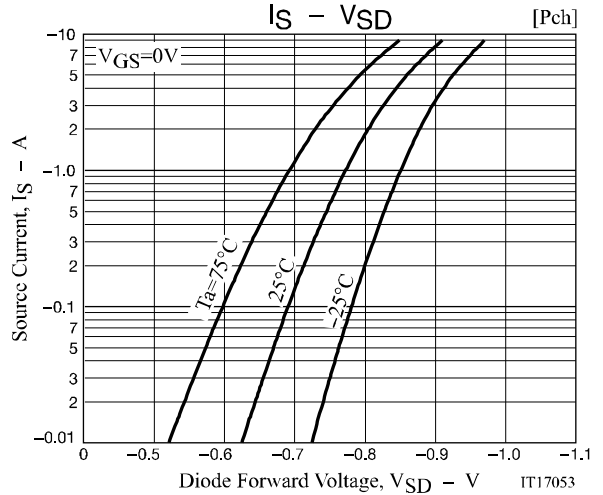
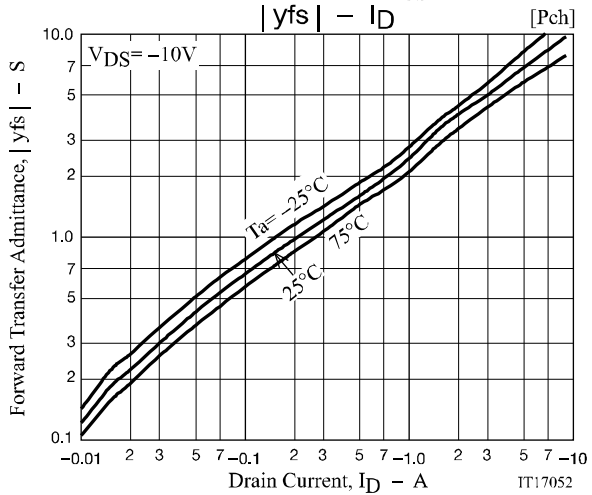
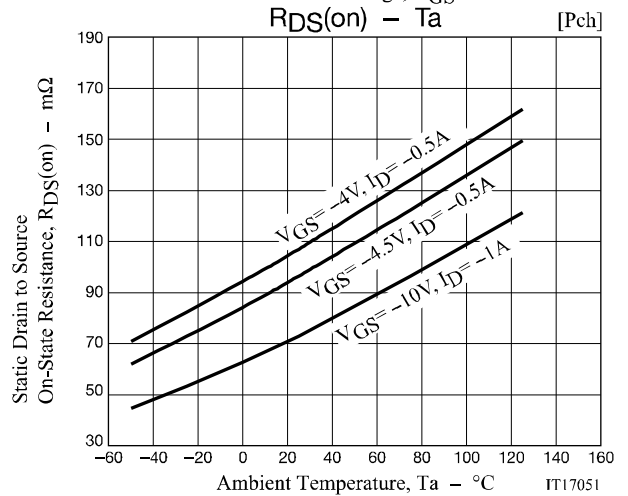
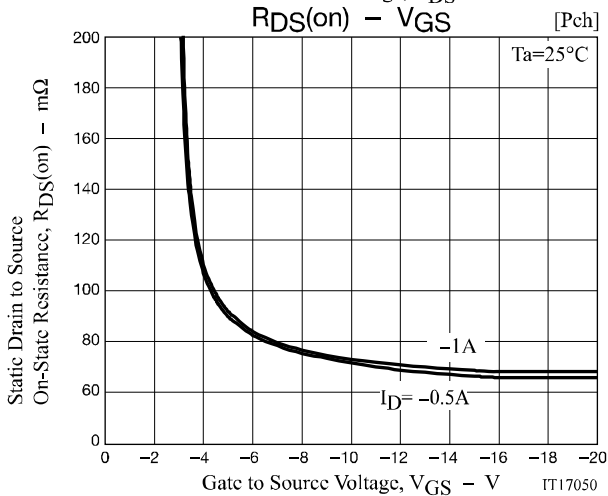
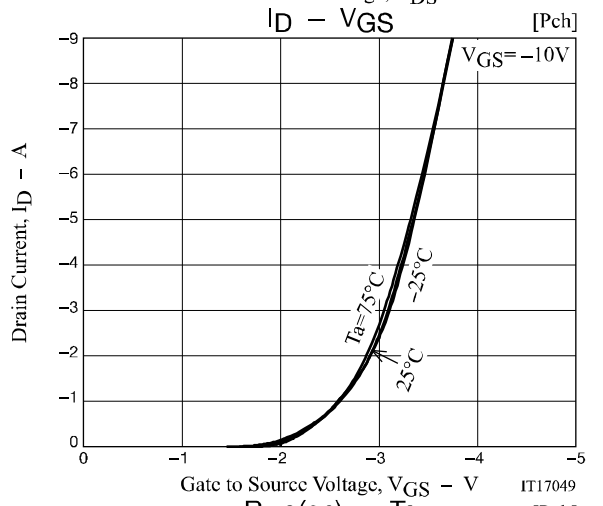
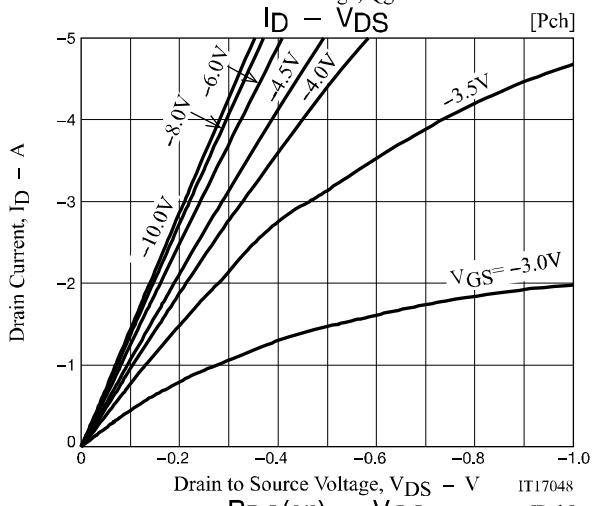
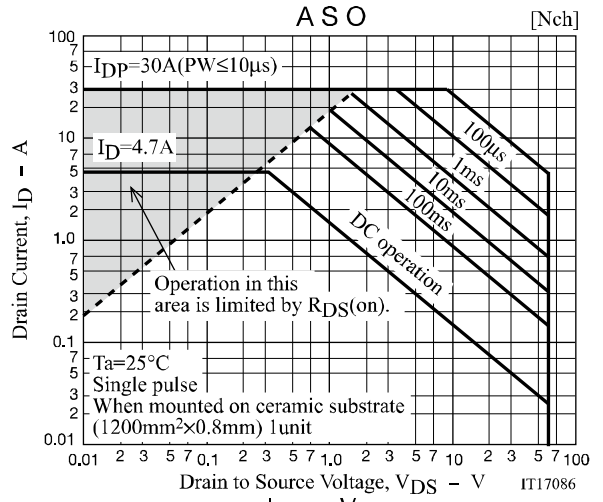
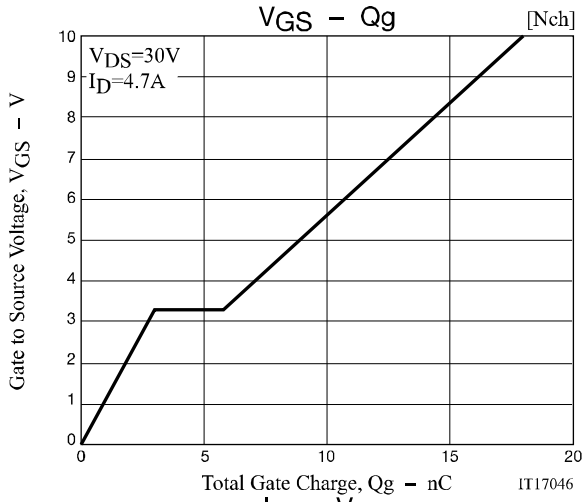
[N-channel]



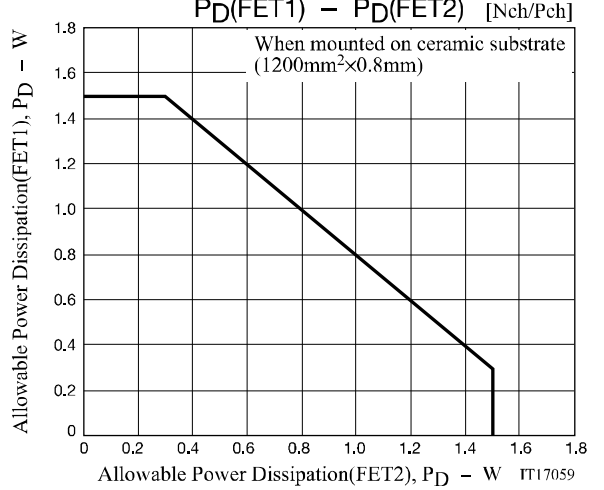
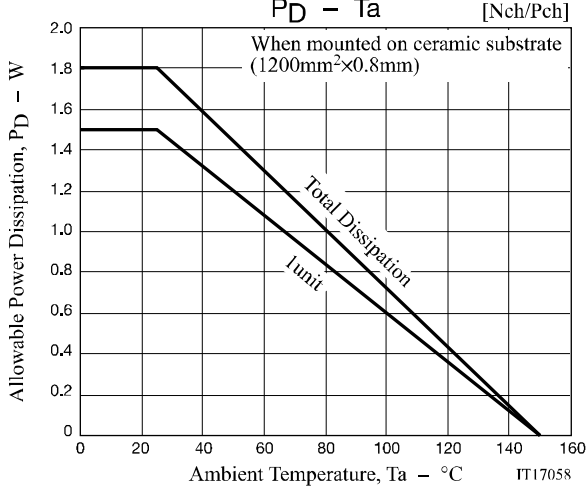
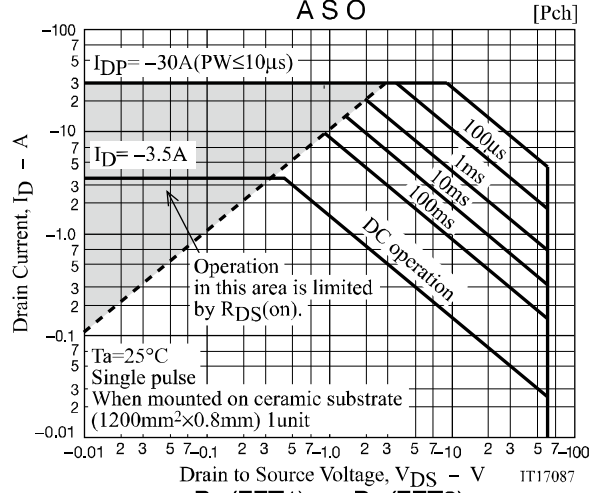
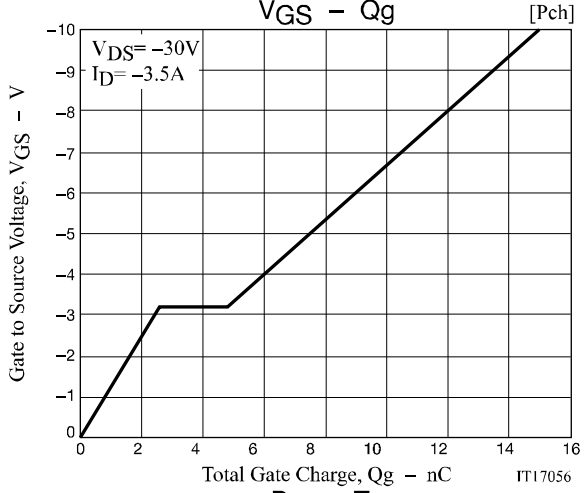
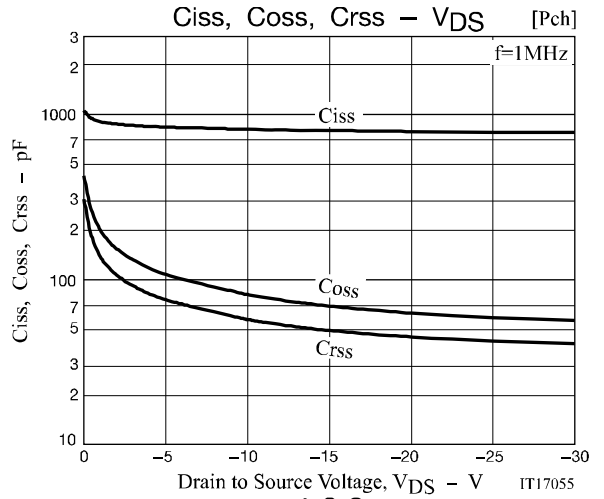
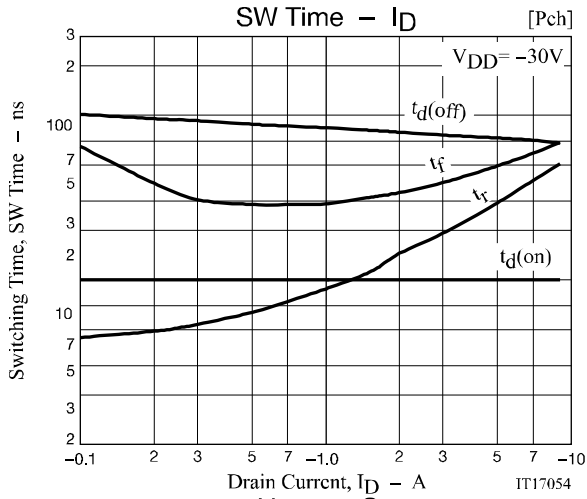
[P-channel]







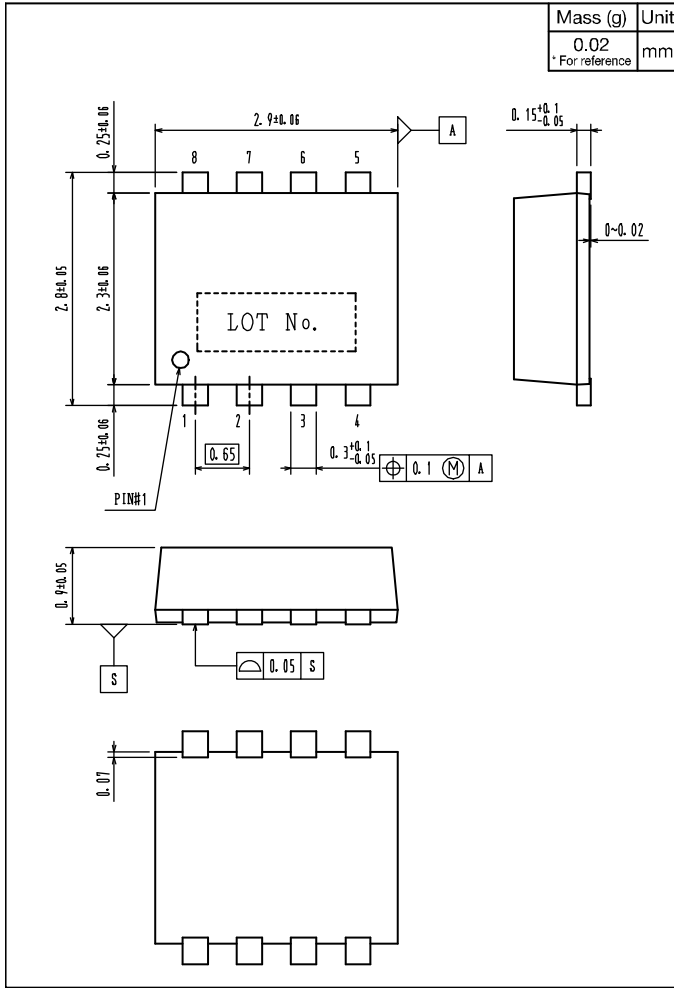
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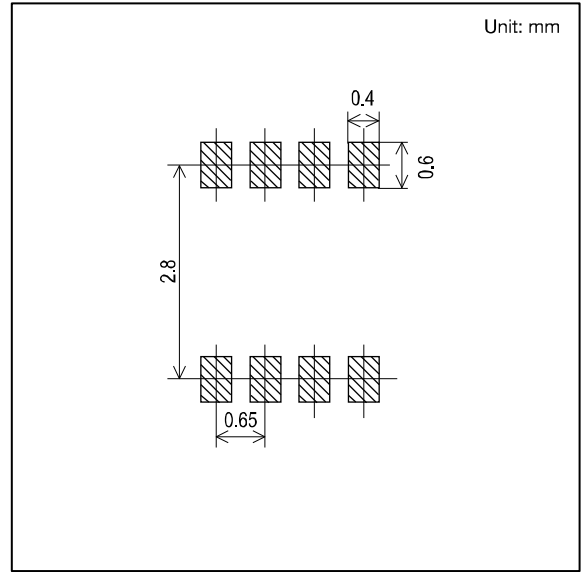
# ECH8690

## Outline Drawing

ECH8690-TL-H



## Land Pattern Example



Note on usage : Since the ECH8690 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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